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Test Construction

Installation Instructions for

HB-16490 AGC ADAPTER

RFL Industries, Inc.
Boonton, New Jersey, U.S.A.

Installation Instructions for

HB-16490 AGC ADAPTER

for

Crystal Impedance Meters
Models 459 and 459A (TS-330/TSM)

RFL Industries, Inc.
Boonton, New Jersey 07005

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INSTALLATION INSTRUCTIONS FOR HB-16490 AGC ADAPTER

DESCRIPTION

The purpose of HB-16490 AGC Adapter is to control the oscillation of the crystal impedance meter at a constant low power level in the range of 1 to 10 microwatts for aging tests. For drive levels greater than 10 microwatts, the AGC GAIN switch S201 on the rear of the adapter may be positioned to reduce the loop gain and permit a greater magnitude of oscillation. The OUT switch position allows the crystal impedance meter to function normally for the testing of crystals at 2 milliwatt drive levels. *Beyond the use of the AGC Adapter for crystal aging tests, it provides an amplified output for electronic frequency counters and eliminates the need for additional amplifiers usually required to amplify the output of the crystal impedance meter. The adapter plugs into the orignal 6V6 oscillator tube socket and requires five wiring changes as given in the installation section.

THEORY OF OPERATION

The Adapter uses five tubes, one of which (V201) replaces the original 6V6 oscillator. As shown in the schematic diagram, type 6AH6 tubes are used for the oscillator, a wide-band amplifier and a series regulating tube for the DC currents to the plate and screen of the oscillator tube. A type 6AK5 tube (V205) is used as a cathode follower to bring out sufficient signal to operate an electronic frequency counter. The output of the broadband amplifier V202 is rectified and doubled with the 6AL5 type tube V203 and used to control the grid of the series regulator tube V204. The loop gain of the AGC circuit is controlled by varying the grid resistance of the series regulator tube with the AGC GAIN switch S201 mounted on the rear of the Adapter. The operation of the crystal impedance meter is identical to the original equipment except that the front panel grid current meter does not receive sufficient current to operate and is replaced functionally by measuring the output of the rectifier-doubler at jack J201, AGC CURRENT, with a multirange DC microammeter covering the ranges of 50 μADC to 10,000 μADC. A test jack J203, OSC PLATE VOLTAGE, at the rear of the chassis permits measurement of the plate voltage supplied the oscillator circuit. This voltage can be correlated to drive level for a particular crystal. The output at BNC jack J202 is used to operate an electronic counter.

*Even when in the "Out" switch position a low level is maintained.

FIELD INSTALLATION

When the HB-16490 AGC Adapter is installed on the C. I. Meter the back of the cover must be punched to expose the jacks and control of the Adapter. This can be easily accomplished by using Marker Plate HB-16495 as a template to locate the hole centers. Punch 0.765 dia. holes. Note that the template is keyed from an adjacent cover mounting screw. Locate this screw by plugging the Adapter into the 6V6 socket and noting relationship of hole and OUTPUT jack.

The wiring changes on the C. I. Meter necessary to install the Adapter may be done by referring to the schematic diagram and performing the operations listed below:

1. Disconnect wire from arm of crystal-current increase potentiometer R142.
2. Disconnect wire from junction R138 and C108 from 210 V (Pin 5 of V103).
3. Connect wire on top of chassis from series regulator V204 (6AH6) plate to center arm of potentiometer R142.
4. Connect the junction of C108 and R138 to pin 4 of X101.
5. Connect pin 6 of X101 to 210 volts (Pin 5 of V103).
6. Connect a 100 ohm resistor between pin 8 of V101 and the high side of C106.

After completion of the wiring changes check the equipment wiring against the schematic diagram and test to the following procedure.

1. Mechanical Inspection:

   a. Inspect solder joints; compare each joint as to wire color with model.
   b. Inspect that all tubes, jacks, and controls are stamped with symbol numbers.
   c. Inspect that HB-16490 and serial number is stamped on unit.

2. Plug a Model 260 Simpson, or equal, set to milliamperes, into the AGC current jack J201. Operate the C. I. Meter to measure and record residual current on all positions of S201 with no crystal in socket and CRYSTAL CURRENT CONTROL counterclockwise.

Position	Milliamperes	Reject above
3	10 uA	0.28 MA
2	30 uA	0.28 MA
1	30 uA	0.1 MA
out	30 uA	20.0 μA

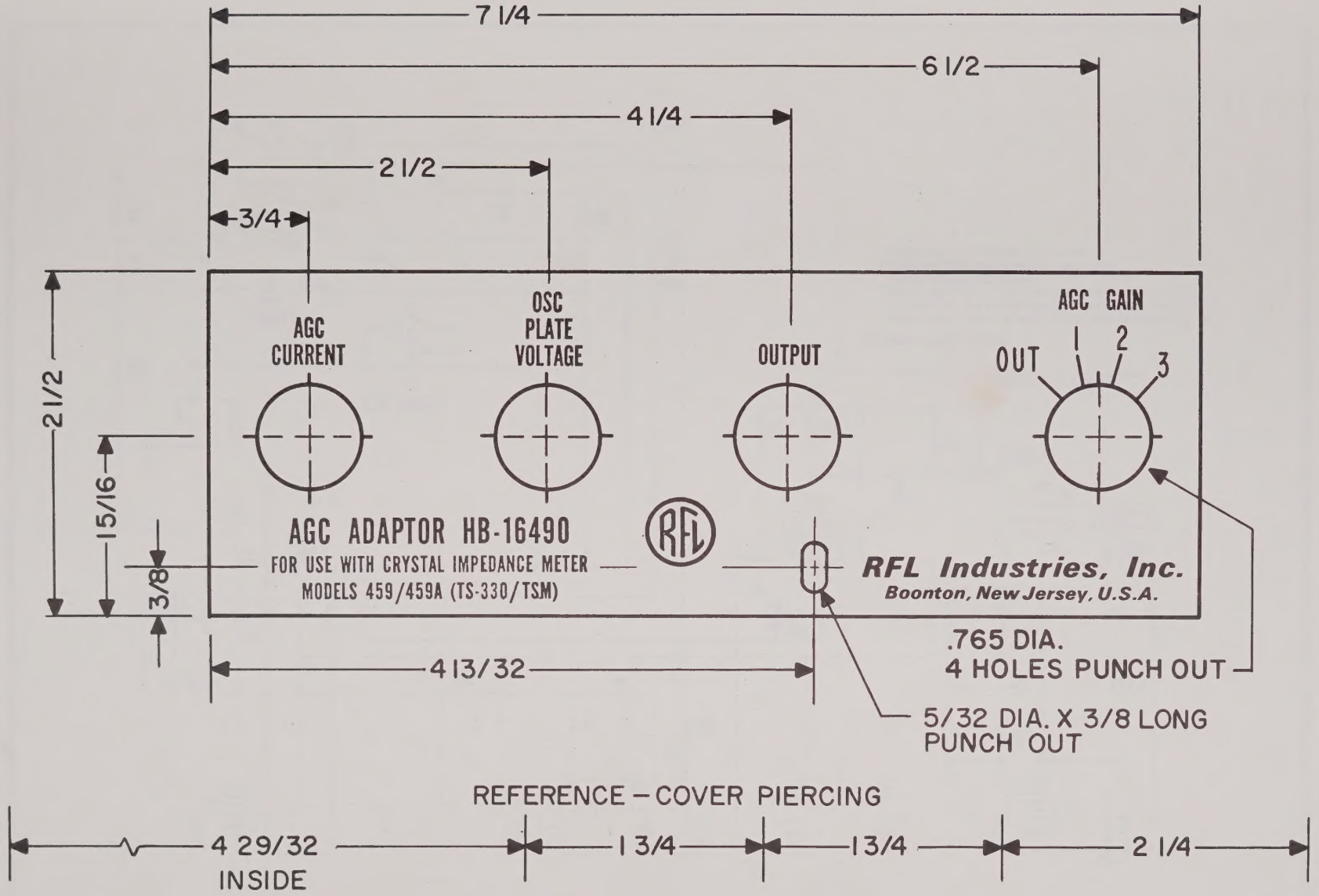
3. Insert a 1 m. c. crystal with resistance of about 430 ohms in socket and operate C. I. Meter to find the AGC output current (J201), frequency output J202, and crystal milliwatts for each position of S201 at minimum and full clockwise position of the CRYSTAL CURRENT CONTROLS. Measure voltage on both sizes of crystal with a Model 314 Ballantine Voltmeter or equal.

The reading should be within ±20% of the nominal given. It is desirable to be able to reduce levels below the "min." and to increase above the "max.".

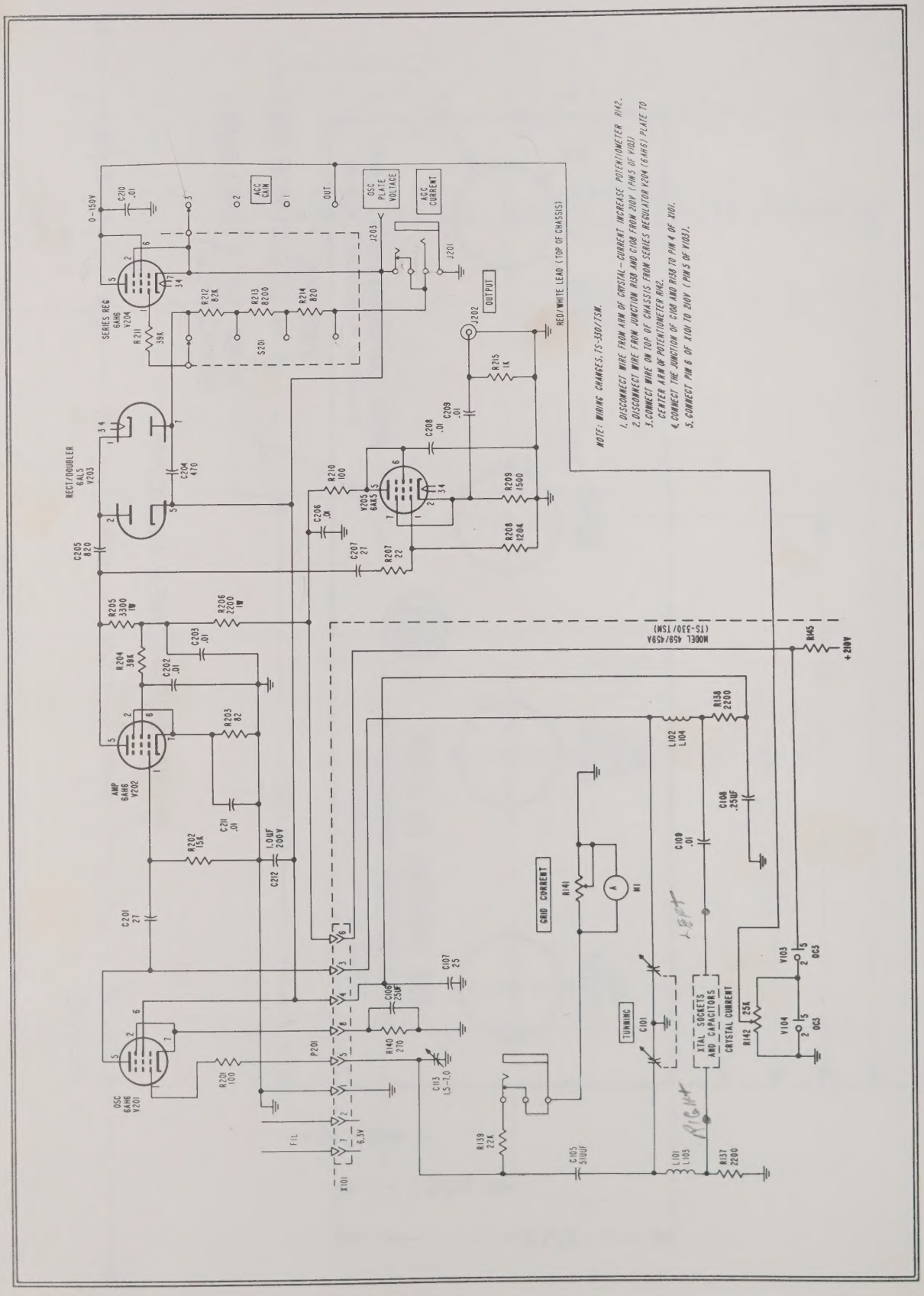
Normally, no attention need be given to the calibration of the 459 & 459A as the instrument has sufficient inherent stability to maintain the original accuracy stability.

However, if the user deems it necessary to recalibrate the complete unit and has the highly precise calibration equipment he can refer to maintenance under Section V of the 459A Instruction Manual.

Position	Crystal Volts In	Crystal Volts Out	AGC MA J201	Volts Out J202
3 min.	(.02) _____	(.003) _____	(.1) _____	(0.10) _____
3 max.	(.028) _____	(.015) _____	(3.0) _____	(1.0) _____
2 min.	(0.1) _____	(.05) _____	(0.5) _____	(2.0) _____
2 max.	(.25) _____	(.1) _____	(3.0) _____	(3.5) _____
1 min.	(.08) _____	(.05) _____	(.09) _____	(1.5) _____
1 max.	(2.9) _____	(.1) _____	(0.5) _____	(4.5) _____
out min.	(.09) _____	(.05) _____	(.1) _____	(1.5) _____
out max.	(5.6) _____	(2.0) _____	(0.7) _____	(5.0) _____



Marker Plate HB-16495.



Schematic Diagram of HB-16490 AGC Adapter.

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